## Space Weather Forecast

Issued on Saturday 18 January 2025 at 00:12 Local

**This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

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**Space Weather Forecast Headline: Minor/Moderate (R1/R2) radio blackouts expected. Chance of Minor geomagnetic storms (G1), easing later in the period.**

**Analysis of Space Weather Activity over past 24 hours**

**Solar Activity:** Activity was Moderate, with several Moderate-class X-ray flares observed, mainly emanating from a complex sunspot region in the northwest, peaking at 17/1335UTC.

There are now eight numbered sunspot regions on the Earth-facing side of the Sun. Foremost amongst these are one in the northwest, which has undergone rapid development in the past 48 hours, although this growth has been slower in recent hours. There remained some significant emergence of intermediate spots and areal growth in the trailing spot, although many of the central spots later migrated westwards to merge with the leading group.

Also of note was the largest sunspot region on the facing side in the southeast. This group also saw significant emergence of its central spots and an overall spreading trend. Other regions on the Sun generally showed more languid growth or else were stable simple magnetic dipoles or unipoles.

A possible progenitor of a Coronal Mass Ejection (CME) occurred around 17/1500UTC, apparently associated with activity immediately southeast of the most active sunspot region. At the time of writing, no obvious CME was in evidence, and no Earth-bound CMEs were observed in available imagery.

**Solar Wind / Geomagnetic Activity:** Solar winds were characterised by fast wind influence, likely to be connection to a large southern solar hemisphere 'coronal hole'. The solar wind speed showed an uptick from 17/0700UTC, after which previously slightly elevated solar winds rose in earnest to reach elevated levels by the period's end. The number of particles in the solar wind showed the opposite tendency, highest early in the period near 10ppcc but falling to normal background with the coronal hole's development. Their associated magnetic field showed slightly elevated highs through mid-period, but starting and finishing nearer background levels.

The net result of the above solar wind measures was nevertheless below Minor Geomagnetic Storm G1 throughout.

**Energetic Particles / Solar Radiation:** No solar radiation storms were observed, despite Moderate-class X-ray flare activity.

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Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

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**Four-Day Space Weather Forecast Summary**

**Solar Activity:** Moderate activity is expected, with occasional Moderate-class flares. There is a now slightly raised slight chance of Strong-class flares, most likely emanating from the most active group in the northwest, or perhaps the largest in the southeast.

**Solar Wind / Geomagnetic Activity:** No CMEs feature in the forecast, which solely comprises the ongoing effects of the current 'coronal hole' fast wind. This should give a chance of minor geomagnetic storm G1 on the first two days of the period, falling away during Tuesday 20 January to leave a quiet midweek period.

**Energetic Particles / Solar Radiation:** High energy proton flux carries a daily slight chance of S1 Minor Solar Radiation storms, rising slightly with the westward advance of the most complex group and raised slightly relative to recent guidance given the increased cadence of potentially suitable flaring events.

## Geomagnetic Storms

| Geomagnetic Storm | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) | Day 2 (00-24 UTC) | Day 3 (00-24 UTC) | Day 4 (00-24 UTC) |
|---|---|---|---|---|---|---|
| Probability (Exceedance) | | | (%) | (%) | (%) | (%) |
| Minor or Moderate | G1 to G2 | No | 50 | 30 | 5 | 1 |
| Strong | G3 | No | 1 | 1 | 1 | 1 |
| Severe | G4 | No | 1 | 1 | 1 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

## Radio Blackouts - X-Ray Flares

| X-Ray Flares | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) | Day 2 (00-24 UTC) | Day 3 (00-24 UTC) | Day 4 (00-24 UTC) |
|---|---|---|---|---|---|---|
| Probability | | | (%) | (%) | (%) | (%) |
| Active | R1-R2 (M Class) | Yes | 80 | 70 | 60 | 60 |
| Very Active | R3-R5 (X Class) | No | 20 | 20 | 15 | 15 |

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## Solar Radiation Storms (High Energy Protons)

| Radiation Storms Probability (Exceedance) | Level ($cm^{-2}sr^{-1}s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| **Active** | **≥ S1** | No | 10 | 10 | 15 | 15 |
| **Very Active** | **≥ S3 *** | No | 1 | 1 | 1 | 1 |
| * S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$) | | | | | | |

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